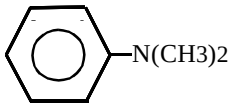
N,N-DIMETHYLANILINE

N,N-Dimethylaniline is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 121-69-7

Molecular Formula: $C_8H_{11}N$



N,N-Dimethylaniline is a pale yellow, oily liquid. It is freely soluble in alcohol, acetone, benzene, chloroform, ether, and organic solvents, and insoluble in water (Merck, 1983; HSDB, 1991).

Physical Properties of N,N-Dimethylaniline

Synonyms: N,N-dimethylbenzenamine; dimethylphenylamine; aniline N,N-dimethyl; benzenamine, N,N-dimethyl

Molecular Weight:	121.18
Boiling Point:	192 - 194 °C
Melting Point:	2.5 °C
Flash Point:	61 °C closed cup
Vapor Density:	4.17 (air = 1)
Density/Specific Gravity:	0.956 at 20/4 °C (water = 1)
Vapor Pressure:	1 mm Hg at 29.5 °C
Conversion Factor:	1 ppm = 4.96 mg/m^3

(HSDB, 1991; Merck, 1983; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

N,N-Dimethylaniline is used as a catalytic fiberglass hardener, a chemical reagent, a solvent, in the manufacture of vanillin and dyes, and as a stabilizer (acid acceptor) (Sax, 1987).

B. Emissions

No emissions of N,N-dimethylaniline from stationary sources in California were reported, based on data obtained from the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of N,N-dimethylaniline was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient concentrations of N,N-dimethylaniline.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of N,N-dimethylaniline was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

N,N-Dimethylaniline exists in the gas phase in the atmosphere. The dominant chemical loss process is by gas-phase reaction with the hydroxyl (OH) radical (reaction with gaseous nitric acid to form the nitrate salt may be of some significance in polluted urban atmospheres). The calculated half-life and lifetime of N,N-dimethylaniline due to reaction with the OH radical are 1.6 hours and 2.3 hours, respectively (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

N,N-Dimethylaniline emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to N,N-dimethylaniline are inhalation and dermal contact (Sittig, 1991).

Non-Cancer: Exposure to N,N-dimethylaniline may cause methemoglobinemia. Symptoms of methemoglobinemia include headaches, dizziness, a bluish color to the skin and lips, troubled breathing, anemia, collapse and death. N,N-Dimethylaniline is also a central nervous system depressant. Overexposure has caused convulsions (Sittig, 1991).

The United States Environmental Protection Agency (U.S. EPA) has not established a Reference Concentration (RfC) for N,N-dimethylaniline. The U.S. EPA has established an oral Reference Dose (RfD) of 0.002 milligrams per kilogram per day for N,N-dimethylaniline based on splenomegaly and increased hemosiderosis and hematopoiesis in mice. The U.S. EPA estimates

that consumption of this dose or less, over a lifetime, would not result in the occurrence of chronic, non-cancer effects (U.S. EPA, 1994a).

No information is available on adverse developmental or reproductive effects of N,N-dimethylaniline in humans. In a study of mice exposed to N,N-dimethylaniline by gavage, no adverse reproductive effects were observed (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of N,N-dimethylaniline in humans. In a study conducted by the National Toxicology Program, rats exposed to N,N-dimethylaniline via gavage showed an increased incidence of sarcomas or osteosarcomas of the spleen. Female mice showed an increased incidence of squamous cell papillomas of the forestomach. The U.S. EPA has not classified N,N-dimethylaniline for potential carcinogenicity (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified N,N-dimethylaniline in Group 3: Not classifiable as to its carcinogenicity to humans (IARC, 1993).